Region 6 UIC Activities: No Migration Petitions, Class VI and Class II Injection Wells

No Migration Petitions - Class I Hazardous Waste Injection Wells

A no-migration petition provides an exemption from federal land disposal restrictions under RCRA so that restricted hazardous waste can be disposed via injection wells into deep saline aquifers. The injection wells associated with a petition are referred to as Class I hazardous waste injectors. Petition are issued in addition to Class I state UIC permits to allow hazardous waste disposal for many chemical plants, refineries, and commercial waste disposal facilities. The petition is a complex technical demonstration document submitted to EPA that includes a combination of Class I injection well construction details, rigorous site characterization, extensive reservoir modeling, mechanical integrity tests, and reservoir testing to show, to a reasonable degree of certainty, that no injected hazardous waste in the project site area will migrate from the designated injection zone over a 10,000 year period.

- Region 6 currently has 32 active no migration petition reissuances and 2 new proposed petitions, in large part due to the favorable nature of Gulf Coast geology in the Region for waste disposal. Region 6 has approximately 74% of the no migration petitions in the U.S., far more than any other region.
- In the last 3 years, R6 has reviewed and finalized 15 reissuances for 32 active petitioned sites.
- In FY2020, R6 issues 5 final reissuance decisions and worked cooperatively with state agencies and regulated facilities on several major remedial injection workover projects.
- Due to recent staff retirements, the R6 UIC section has implemented an internal training program for new staff to train them in review of petitions and the associated annual monitoring and testing data.

Class VI Wells

Class VI wells are used to inject carbon dioxide (CO2) into deep reservoir formations. This long-term underground storage is called geologic sequestration (GS). GS refers to technologies used to reduce CO2 emissions to the atmosphere and help mitigate climate change. The sequestered CO2 is captured from an industrial (e.g., steel, ethanol and cement production) or energy-related source (e.g., a power plant or natural gas processing facility).

- Class VI well requirements are very stringent and designed to protect underground sources of drinking water (USDWs) by ensuring containment of the CO2. These requirements address well siting, construction, operation, testing, monitoring and closure. The Class VI regulations address the unique nature of CO2 injection for GS, including its significant relative buoyancy, substantial subsurface mobility, corrosivity in the presence of water and the large CO2 injection volumes anticipated at GS projects. Site characterization and modeling are key components of a Class VI permit.

- Underground injection of CO2 for purposes such as enhanced oil recovery (EOR) is a long-standing practice and is regulated under Class II injection wells. CO2 injection specifically for GS involves different technical issues and potentially much larger volumes of CO2 and larger scale projects than EOR.

- In December 2010, EPA published the final Class VI rule. The Class VI program is implemented nationally by EPA except in North Dakota which was delegated authority to implement the

program on 4/24/18. On 9/3/20, Wyoming became the second state to be delegated Class VI primacy. As of 10/5/20 in R6, LDNR (Louisiana) has completed the pre-application phase, Phase 1, of the primacy process and R6 and HQ have recommended that LDNR formally submit a complete primacy package for Phase 2, a completeness review and determination phase.

- There are currently only two permitted and active Class VI wells in the nation which are located at the Archer Daniels Midland ethanol production plant in Decatur, Illinois.

- There have been numerous inquiries nationwide about potential Class VI GS projects motivated by the IRS Section 45Q increased tax credits. In R6 there have been inquiries related to potential projects in all 5 states in the region.

- To date, R6 has held formal project and permitting discussions for four project sites in Louisiana, one in New Mexico, and two in Texas. On 10/13/20, R6 also received a partial Class VI permit application from Gulf Coast Sequestration (GCS) for a SW Louisiana site.

Class II Injection Wells

Class II wells are used only to inject fluids associated with oil and natural gas production and storage. Class II fluids are primarily brines (salt water) that are brought to the surface while producing oil and gas. It is estimated that over 2 billion gallons of fluids are injected in the United States every day. Most oil and gas injection wells are in Texas, California, Oklahoma, and Kansas. The number of Class II wells varies from year to year based on fluctuations in oil and gas demand and production. Approximately 180,000 Class II wells are in operation in the United States.

Over the last several years, States and R6 have been confronted by two significant issues related to disposal wells: induced seismicity and saltwater purges to surface.

- **Induced Seismicity** – Since at least 2008, increases in earthquake activity have been experienced in several states nationally, including Arkansas, Oklahoma, New Mexico, and Texas. This activity was suspected by many to be related to oil and gas activity.
  - In 2011, EPA tasked its national UIC Technical Workgroup to perform a study of injection induced seismicity. The workgroup, led by Region 6, finalized a report in February 2015 which provided practical approaches for UIC regulators to manage and minimized injection induced seismicity.
  - Over the last 10 years much has been learned on this subject and States, particularly Oklahoma, have successfully enacted strategies to manage and minimize seismic activity.

- **Saltwater Purges** – EPA Region 6 has recently been involved in two cases of saltwater purging to surface due to Class II wells and site containment issues.
  - **Bird Creek, Osage County, OK** – EPA implements the UIC program in Osage County and recently completed an enforcement case involving saltwater contamination of surface water impacting Bird Creek in Osage County.
    - The Agency concluded the contamination was the result of nearby Class II wells and containment failure at the site and issued three enforcement orders.

- R6 recently implemented a Settlement Agreement with the associated well operators who have successfully addressed the contamination with injection well operational changes.

- **Blaine/Kingfisher Counties, OK** - The Region is currently providing technical support to the Oklahoma Corporation Commission on saltwater purges across a two-county area in north-central Oklahoma.
    - The purges are believed to be due to a combination of issues associated with construction practices of surrounding producing wells and in part to increased disposal volumes brought on by unconventional oil and gas technologies and shallower injection zones resulting from restrictions into the deeper Arbuckle Formation due to seismicity concerns.